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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JUERGEN BENZ and REINHARD BERGER

Appeal 2010-001473
Application 10/791,432
Technology Center 3600

Before: JOHN C. KERINS, KEN B. BARRETT, and
PHILLIP J. KAUFFMAN, *Administrative Patent Judges*.

KAUFFMAN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Juergen Benz and Reinhard Berger (Appellants) appeal under 35 U.S.C. § 134 from a rejection of claims 1-22. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

THE INVENTION

Appellants' claimed invention "relates to a method for controlling a clutch which is located between a drive motor and an automated manual transmission of a drive train." Spec. 1, para. [0002]. Claim 1, reproduced below, is representative of the subject matter on appeal.

1. A method for controlling a clutch located between a drive motor and an automated manual transmission of a drive train, the method comprising:

controlling the clutch so as to change from an engine braking mode to a free wheeling¹ mode; and

reengaging the clutch when a gas pedal is operated in the free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed.

REJECTION

Appellants seek review of the Examiner's rejection of claims 1-22 under 35 U.S.C. § 103(a) as being unpatentable over Shigyo (US 6,878,095 B2; issued April 12, 2005) and Nozaki (US 5,547,438; issued August 20, 1996).

CONTENTIONS AND ISSUES

Appellants argue claims 1-17 as a group. App. Br. 5-7. We select claim 1 as the representative claim, and claims 2-17 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii).

¹ Claim 1 uses the term "free-wheeling" both with and without a hyphen. We hyphenate the term throughout for consistency.

Independent claim 1 is directed to a method for controlling a clutch located between a drive motor and an automated manual transmission of a drive train that includes the step of “reengaging the clutch when a gas pedal is operated in free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed.”

The Examiner found that Shigyo discloses a clutch control system that controls the clutch (by disengaging it) so as to change from an engine braking mode to a free-wheeling mode. Ans. 3-4. The Examiner also found that Shigyo does not disclose reengaging the clutch when a gas pedal is operated in free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed. *Id.* The Examiner found that Nozaki discloses that clutch 24 should be engaged when the engine speed (N_E) is higher than the transmission input speed (N_T) so that damper (23) can desirably absorb an engaging shock of coupling members of clutch 24. Ans. 4. The Examiner concluded that based on this teaching in Nozaki it would have been obvious to modify Shigyo’s system to control the clutch so as to change from the engine braking mode to the free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed, “in order to effectively implement smooth engagement/reengagement of the clutch and eliminate any engaging shock associated with the clutch operations.” Ans. 5.

Appellants make several assertions that Nozaki does not disclose “reengaging the clutch when a gas pedal is operated in free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed,” and that the Examiner’s rationale for the proposed combination is insufficient. App. Br. 5-7.

The first issue is whether the proposed combination of Nozaki and Shigyo would have rendered the subject matter of independent 1 obvious to a person having ordinary skill in the art.

Independent claims 20-22 are method claims directed to controlling a clutch. Claims 20-22 each contain a “wherein” clause calling for the clutch to disengage and implement the free-wheeling mode based on a specified criteria.

The Examiner found that Shigyo discloses disengaging a clutch to implement the free-wheeling mode based on each of the three criteria called for in independent claims 20-22. Ans. 5-7. Appellants contend that the Examiner erred in rejecting claims 20-22 because Shigyo does not disclose or discuss any of the three criteria for disengaging the clutch to implement the free-wheeling mode. App. Br. 8-11; Reply Br. 3-5.

The second issue is whether Shigyo discloses the criteria for disengaging the clutch to implement the free-wheeling mode as called for in independent claims 20-22.

ANALYSIS

Claims 1-17

Shigyo discloses a method for controlling (via controller 31) a clutch (clutch 4) located between a drive motor and an automated manual transmission of a drive train. Shigyo, col. 2, ll. 3-5; col. 4, ll. 12-13; fig. 1 (clutch 4 is arranged with crankshaft 5 to the right and the transmission to the left).

Shigyo discloses controlling (via controller 31) the clutch (clutch 4) so as to change from an engine braking mode (coast traveling condition wherein the accelerator pedal is put in a released state) to a free-wheeling mode (a “slipping state” wherein the clutch 4 is disengaged) when the

deceleration of the vehicle is greater than or equal to a predetermined value. Shigyo, col. 1, ll. 34-40, 51-56; fig. 3.

Accordingly, the difference between Shigyo's method and that of claim 1 is that Shigyo does not disclose reengaging the clutch when a gas pedal is operated in the free-wheeling mode only when engine rotational speed is above a transmission input rotational speed. *See* Ans. 4.

Nozaki discloses an apparatus for controlling the engine of a motor that detects vehicle deceleration (e.g., when the gas pedal is released, step SE2), and then restricts engine speed N_E (step SE3) so that engine speed N_E is prevented from being lower than the input speed N_T of the transmission 14, which permits "easy, smooth engagement action of the lock-up clutch." Nozaki, col. 1, ll. 8-13; col. 10, l. 66 – col. 11, l. 11; fig. 6.

Consequently, Nozaki discloses reengaging the clutch ("smooth engagement action" of lock-up clutch 24) when a gas pedal is operated in the free-wheeling mode (when the gas pedal is released, step SE2) only when an engine rotational speed (engine speed N_E) is above a transmission input rotational speed (input speed N_T of the transmission 14).

Given this, a person of ordinary skill in the art would recognize that Nozaki's technique to improve control of a lock-up clutch would improve control of a similar device (i.e., Shigyo's clutch 4) in the same way, so that use of the technique is obvious. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

Appellants assert that a person of ordinary skill in the art "would not have been able to combine elements as claimed and no predictable results would have been yielded." App. Br. 6. As discussed, *supra*, Shigyo discloses controlling a clutch so as to change from an engine braking mode to a free-wheeling mode when the deceleration of the vehicle is greater than

Appeal 2010-001473
Application 10/791,432

or equal to a predetermined value, and Nozaki discloses that it was known in the art to reengage the clutch when a gas pedal is operated in free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed. We consider these references as reflective of the high level of skill in the art, and for that reason find Appellants' assertion unpersuasive. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) ("[T]he absence of specific findings on the level of skill in the art does not give rise to reversible error 'where the prior art itself reflects an appropriate level and a need for testimony is not shown'" (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (It is proper to "take account of the inferences and creative steps that a person of ordinary skill in the art would employ.")). Additionally, Appellants' assertion is not persuasive because "Appellants' arguments do not take the place of evidence." *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974).

Appellants contend that Nozaki's lock-up clutch 24 is so different from a conventional clutch that it is simply not relevant to the engagement and disengagement of a conventional clutch as called for in independent claim 1. App. Br. 6-7; Reply Br. 2-3. We disagree.

The general problem facing Appellants at the time of the claimed invention was improving the connection between an engine and its drive train. Spec. 1, para. [0004]. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("In considering motivation in the obviousness analysis, the problem examined is not the specific problem solved by the invention but the general problem that confronted the inventor before the invention was made." (citations omitted)).

Nozaki's lock-up clutch 24, like a conventional disc-based clutch, is located between a drive motor and a transmission, and connects the vehicle engine to the transmission. *See* Nozika, col. 1, ll. 15-18; fig. 5; *see also* Spec. 1, paras. [0002]-[0004]. Further, control of Nozaki's lock-up clutch 24, like control of a conventional disc-based clutch, engages and disengages transmission of power between the engine and transmission. *See* Nozaki, col. 1, ll. 16-19; *see also* Spec. 1, para. [0003]; 2, paras. [0006]-[0007]. Consequently, Nozaki's lock-up clutch 24 logically would have commended itself to an inventor's attention in considering this problem. *See* Nozika, col. 1, ll. 15-18; *see also In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379-80 (Fed. Cir. 2007) ("A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.").

Appellants' argument that there would have been no reason or motivation to combine the references is unconvincing because it fails to address the rationale provided by the Examiner, namely "to effectively implement smooth engagement/reengagement of the clutch and eliminate any engaging shock associated with the clutch operations." *See* Ans. 5; App. Br. 6.

Appellants argue that Shigyo teaches away from the limitations of claim 1 in that Shigyo "is not concerned with engine or transmission speed but uses other sensors." App. Br. 6. Appellants do not point to, nor can we find, any portion of Shigyo that criticizes, discredits, or otherwise discourages use of engine or transmission rotational speed as a factor for control of a clutch. *Shigyo, passim*. We fail to see how Shigyo's silence regarding use of engine and transmission rotational speed suggests that use

Appeal 2010-001473
Application 10/791,432

of such would have been unlikely to be productive. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“When a piece of prior art ‘suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant’ the piece of prior art is said to ‘teach away’ from the claimed invention” (quoting *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994))).

Similarly, we are unpersuaded by Appellants’ argument that Nozaki teaches away from the limitations of claim 1 in that Nozaki refers to a lock-up clutch having an automatic transmission without an automated clutch while, in contrast, claim 1 calls for an automated manual transmission having an automated clutch. App. Br. 6. Appellants do not point to, nor can we find, any portion of Nozaki that criticizes, discredits, or otherwise discourages use of the lock-up clutch control technique with an automated clutch and a manual transmission. We fail to see how such silence suggests the line of development chosen by Appellants was unlikely to be productive. We find that Shigyo and Nozaki do not teach away from the proposed combination.

As such, we sustain the rejection of claim 1, and claims 2-17 fall with claim 1.

Claims 18 and 19

Appellants argue claims 18 and 19 as a group. App. Br. 7-8. We select claim 18 as the representative claim, and claim 19 stands or falls with claim 18. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Independent claim 18 is directed to a drive train comprising a controller. The controller of claim 18 is similar to that of claim 1 in that the controller is capable of “reengaging the clutch when a gas pedal is operated

in the free-wheeling mode only when an engine rotational speed is above a transmission input rotational speed.”

Appellants reiterate the arguments used against the rejection of claim 1. App. Br. 7-8; Reply Br. 2-3. We find no distinction in independent claim 18 warranting a deviation from our analysis of the rejection of claim 1, *supra*. We sustain the rejection of claim 18, and claim 19 falls with claim 18.

Claim 20

Independent claim 20 is directed to a method of controlling a clutch located between a drive motor and an automated manual transmission of a drive train comprising: “controlling the clutch so as to change from an engine braking mode to a free-wheeling mode, wherein the clutch is disengaged to implement the free-wheeling mode when a transmission gear is equal to or less than a maximum free-wheeling gear” (emphasis added). The, “wherein” clause calls for the clutch to disengage and implement the free-wheeling function if the transmission gear is equal to or less than a maximum free-wheeling gear. A person of ordinary skill in the art would interpret claim 20 to call for controlling the clutch to disengage and change into free-wheeling mode when two initial conditions are met: (1) the drive train is in engine braking mode and (2) the transmission gear is equal to or less than a maximum free-wheeling gear.²

The Examiner found that Shigyo discloses “when clutch 4 is completely disengaged, the gear ratio, at which the clutch 4 is completely

² This interpretation is consistent with Appellants’ Specification, which describes several circumstances (e.g. the transmission gear being equal to or less than a maximum free-wheeling gear) that may serve as initial conditions for the free-wheeling function. Spec. 2, para. [0007].

disengaged, is the maximum free-wheeling gear.” Ans. 5, 11 (citing Shigyo, col. 6, ll. 45-53).

Shigyo discloses that when vehicle deceleration α is greater than or equal to a preset deceleration α_1 , automatic clutch 4 is put into a slip state (disengaged) in order to prevent excessive engine braking. Shigyo, col. 6, ll. 28-53; fig. 4. Thus, Shigyo discloses controlling the clutch (clutch 4) through use of engine braking mode as an initial condition for disengaging the clutch to change to free-wheeling mode. However, as Appellants correctly point out, Shigyo does not disclose controlling the clutch through use of the transmission gear being equal to or less than a maximum free-wheeling gear as an initial condition for disengaging the clutch to change to free-wheeling mode. Shigyo, *passim*; App. Br. 8-9; Reply Br. 3-4. As such, we cannot sustain the rejection of independent claim 20.

Claim 21

Independent claim 21 is directed to a method of controlling a clutch located between a drive motor and an automated manual transmission of a drive train comprising: “controlling the clutch so as to change from an engine braking mode to a free-wheeling mode, wherein the clutch is disengaged to implement the free-wheeling mode when a vehicle’s driving speed is less than a maximum free-wheeling speed.”

Similar to claim 20, a person of ordinary skill in the art would interpret claim 21 to call for controlling the clutch to disengage when two conditions are met: (1) the drive train is in engine braking mode and (2) the vehicle’s driving speed is less than a maximum free-wheeling speed.

The Examiner found that “it is inherent that the clutch 4 must be disengaged and the free-wheeling mode must also be implemented when the driving speed is lower than a minimum driveable speed of the presently

engaged transmission gear, which is less than the maximum speed that the free-wheeling mode can be implemented for the presently engaged transmission gear, in order to prevent the engine from being stalled.” Ans. 6-7, 11-12 (citing Shigyo, col. 6, ll. 7-53).

As discussed in the analysis of claim 20, *supra*, Shigyo discloses controlling the clutch (clutch 4) to disengage when the drive train is in engine braking mode. However, as Appellants correctly point out, Shigyo does not disclose control of the clutch through use of the vehicle's driving speed as an initial condition for disengaging the clutch to change to free-wheeling mode. Shigyo, *passim*; App. Br. 9-10; Reply Br. 5. Further, even if the Examiner's assertion is correct that the absence of consideration of the vehicle's driving speed could induce the engine to stall, that does not necessarily mean that Shigyo's method of control uses the vehicle's driving speed as a condition for disengaging the clutch. *See In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (“Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” (citations and internal quotation marks omitted)).

As such, we cannot sustain the rejection of independent claim 21.

Claim 22

Independent claim 22 is directed to a method of controlling a clutch located between a drive motor and an automated manual transmission of a drive train comprising: “controlling the clutch so as to change from an engine braking mode to a free-wheeling mode, wherein the clutch is disengaged to implement the free-wheeling mode when no downhill driving is detected.”

Similar to claims 20 and 21, *supra*, a person of ordinary skill in the art would interpret claim 22 to call for controlling the clutch to disengage when two conditions are met: (1) the drive train is in engine braking mode and (2) no downhill driving is detected.

The Examiner found that “the free-wheeling mode is implemented based on a preset deceleration; and, there is no mention of downhill driving detection as a condition for implementing the free-wheeling mode.” Ans. 7, 12 (citing Shigyo, col. 6, ll. 45-53).

As discussed in the analysis of claim 20, *supra*, Shigyo discloses controlling the clutch (clutch 4) to disengage when the drive train is in engine braking mode. However, as Appellants correctly point out, Shigyo does not disclose that this process of control uses the absence of detection of downhill driving as an initial condition for disengaging the clutch to change to free-wheeling mode. Shigyo, *passim*; App. Br. 10-11; Reply Br. 5.

As such, we cannot sustain the rejection of independent claim 22.

CONCLUSIONS OF LAW

The proposed combination of Nozaki and Shigyo would have rendered the subject matter of independent claim 1 obvious to a person having ordinary skill in the art.

Shigyo does not disclose or render obvious the criteria for disengaging the clutch to implement the free-wheeling mode as called for in independent claims 20-22.

DECISION

We affirm the Examiner’s decision to reject claims 1-19.

We reverse the Examiner’s decision to reject independent claims 20-22.

Appeal 2010-001473
Application 10/791,432

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

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